REMARKS

In the final Office Action, the Examiner rejected claims 1-7, 9-19, 21-28, 30-37, and 40-42 under 35 U.S.C. § 103(a) as allegedly unpatentable over Garg et al. ("Improved Approximation Algorithms for Biconnected Subgraphs via Better Lower Bounding Techniques") in view of Li et al. ("Sending Messages to Mobile Users in Disconnected Ad-hoc Wireless Networks") and Templin (U.S. Patent Application Publication No. 2001/0040895); rejected claims 8 and 29 under 35 U.S.C. § 103(a) as allegedly unpatentable over Garg et al., Li et al., and Templin in view of Jennings et al. ("Topology Control for Efficient Information Dissemination in Ad-hoc Networks"); rejected claim 20 under 35 U.S.C. § 103(a) as unpatentable over Garg et al., Li et al., and Templin in view of Liao et al. ("GRID: A Fully Location-Aware Routing Protocol for Mobile Ad Hoc Networks"); rejected claims 38, 39, and 49 under 35 U.S.C. § 103(a) as allegedly unpatentable over Garg et al. in view of Li et al.; rejected claims 43, 44, 46, and 47 under 35 U.S.C. § 103(a) as allegedly unpatentable over Garg et al., Li et al., and Liao et al. in view of Gibson et al. (U.S. Patent No. 6,362,821); rejected claim 45 under 35 U.S.C. § 103(a) as allegedly unpatentable over Garg et al., Li et al., Liao et al., and Gibson et al. in view of Proctor, Jr. et al. (U.S. Patent No. 5,960,047); rejected claim 48 under 35 U.S.C. § 103(a) as allegedly unpatentable over Garg et al. and Li et al. in view of Liao et al.; rejected claims 50-52 and 54 under 35 U.S.C. § 103(a) as allegedly unpatentable over Hsu ("Simpler and Faster Biconnectivity Augmentation") in view of Li et al.; and rejected claims 53 and 55 under 35 U.S.C. § 103(a) as allegedly unpatentable over Hsu and Li et al. in view of Lin et al. ("Adaptive Clustering for Mobile Wireless Networks"). Applicants traverse these rejections.[1]

[1] As Applicants' remarks with respect to the Examiner's rejections overcome the rejections, Applicants' silence as to certain assertions by the Examiner in the Office Action or certain requirements that may be applicable to such rejections (e.g., whether a reference constitutes prior art, reasons for modifying a reference and/or combining references, assertions as to dependent claims, etc.)

REJECTION UNDER 35 U.S.C. § 103 BASED ON GARG ET AL. AND LI ET AL.

Claims 38, 39, and 49 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Garg et al. in view of Li et al. Applicants traverse the rejection.

Claim 38 is directed to a method for achieving biconnectivity in a network that includes a plurality of nodes. The method comprises generating a graph of the network; identifying cutvertices in the network; and causing one or more of the nodes in the network to move to systematically remove the cutvertices from the network and form a biconnected network.

Garg et al. and Li et al., whether taken alone or in any reasonable combination, do not disclose or suggest the combination of features recited in claim 38. For example, Garg et al. and Li et al. do not disclose or suggest causing one or more of the nodes in the network to move to systematically remove the cutvertices from the network and form a biconnected network.

The Examiner alleged that Garg et al., at sections 3.1.1 and Li et al., at section 1, disclose moving one or more of the nodes in the network to systematically remove the cutvertices from the network and form a biconnected network (final Office Action, pp. 20-21). Without acquiescing in the Examiner's allegation, Applicants submit that Garg et al. and Li et al. do not disclose or suggest causing one or more of the nodes in the network to move to systematically remove the cutvertices from the network and form a biconnected network, as recited in claim 38.

In section 3.1.1, Garg et al. discloses an algorithm that picks a set of edges that form a 2-vertex connected spanning subgraph and partitions the vertices into blocks that are used to modify the set of edges. Nowhere in this section, or elsewhere, does Garg et al. disclose or suggest causing

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is not a concession by Applicants that such assertions are accurate or that such requirements have been met, and Applicants reserve the right to dispute these assertions/requirements in the future.

one or more of the nodes in the network to move to systematically remove the cutvertices from the network and form a biconnected network, as recited in claim 38.

In section 1, Li et al. discloses an algorithm for computing a trajectory for sending a message from host A to host B by recruiting intermediate hosts to help. Nowhere in this section, or elsewhere, does Li et al. disclose or suggest causing one or more of the nodes in the network to move to systematically remove the cutvertices from the network and form a biconnected network, as recited in claim 38. In fact, Li et al. is not concerned with whether a network is biconnected. Instead, Li et al. is directed to algorithms for keeping a network connected where the network includes mobile hosts (section 1).

In the final Office Action, the Examiner alleges that Garg et al. discloses the "removing of the cutverticies from the network to form a biconnected network" (final Office Action, pg. 2). Applicants respectfully disagree with the Examiner's allegation.

As noted by the Examiner, Garg et al. discloses finding minimum 2-edge connected and 2-vertex connected subgraphs in a given graph (abstract). Finding minimum 2-edge connected and 2-vertex connected subgraphs is in no way equivalent to systematically removing cutvertices from a network and forming a biconnected network. Therefore, Garg et al. does not disclose or suggest causing one or more of the nodes in the network to move to systematically remove the cutvertices from the network and form a biconnected network, as recited in claim 38.

The Examiner further alleges that "biconnected graphs are defined by a lack of cut vertices, and thus making a graph biconnected inherently results in the removal of cut vertices" (final Office Action, pg. 3). Regardless of the validity of the Examiner's statement, Garg et al. does not disclose systematically removing cutvertices from a network and forming a biconnected network. Therefore,

Garg et al. does not disclose or suggest causing one or more of the nodes in the network to move to systematically remove the cutvertices from the network and form a biconnected network, as recited in claim 38.

For at least these reasons, Applicants submit that claim 38 is patentable over Garg et al. and Li et al., whether taken alone or in any reasonable combination.

Independent claim 39 is directed to a method for achieving biconnectivity in a non-biconnected network that includes a plurality of nodes. The method comprises identifying one or more of the nodes to move; determining direction and distance to move the one or more nodes; and moving the one or more nodes in the determined direction and distance to transform the non-biconnected network to a biconnected network.

Garg et al. and Li et al., whether taken alone or in any reasonable combination, do not disclose or suggest the combination of features recited in claim 39. For example, Garg et al. and Li et al. do not disclose or suggest moving one or more nodes in a determined direction and distance to transform a non-biconnected network to a biconnected network.

The Examiner admitted that Garg et al. does not disclose this feature and cited sections section 1 of Li et al. for support (final Office Action, pp. 4 and 21-22). Applicants submit that the disclosure of Li et al. does not support the Examiner's allegation.

As noted above, in section 1, Li et al. discloses an algorithm for computing a trajectory for sending a message from host A to host B by recruiting intermediate hosts to help. This section of Li et al. discloses computing a trajectory for sending a message, not moving one or more nodes in the determined direction and distance to transform a non-biconnected network to a biconnected network, as recited in claim 39.

The Examiner does not explain why one skilled in the art would reasonably construe Li et al.'s disclosure of computing a trajectory for sending a message from host A to host B by recruiting intermediate hosts to help as equivalent to moving one or more nodes in the determined direction and distance to transform a non-biconnected network to a biconnected network, as recited in claim 39. Thus, a *prima facie* case of obviousness has not been established with regard to claim 39.

For at least these reasons, Applicants submit that claim 39 is patentable over Garg et al. and Li et al., whether taken alone or in any reasonable combination.

Independent claim 49 recites features similar to, yet possibly different in scope from, features recited in claim 39. Therefore, claim 49 is patentable over Garg et al. and Li et al., whether taken alone or in any reasonable combination, for at least reasons similar to reasons given with regard to claim 39.

REJECTION UNDER 35 U.S.C. § 103 BASED ON GARG ET AL., LI ET AL., AND TEMPLIN

Claims 1-7, 9-19, 21-28, 30-37, and 40-42 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Garg et al., Li et al., and Templin. Applicants traverse the rejection.

Claim 1 is directed to a method for achieving biconnectivity in a network that includes a plurality of nodes. The method comprises forming blocks from groups of one or more of the nodes in the network; selecting one of the blocks as a root block; identifying other ones of the blocks as leaf blocks; and collectively moving the nodes in one or more of the leaf blocks to make the network biconnected.

Garg et al., Li et al., and Templin, whether taken alone or in any reasonable combination, do not disclose or suggest the combination of features recited in claim 1. For example, Garg et al., Li

et al., and Templin do not disclose or suggest collectively moving nodes in one or more of the leaf blocks to make the network biconnected.

The Examiner admitted that Garg et al. does not disclose or suggest moving one or more leaf blocks (final Office Action, pg. 10). The Examiner alleged that Li et al. discloses moving nodes, but admitted that Li et al. does not disclose or suggest that node movements are done in blocks (final Office Action, pg. 10). The Examiner alleged that Templin discloses that "node movement should be minimized, as it results in increased transmissions and can temporarily diminish network performance" and cited paragraph 0039 of Templin for support (final Office Action, pg. 11). Even assuming, for the sake of argument, that Templin discloses exactly what the Examiner alleged (a point that Applicants do not concede), the Examiner has not established a *prima facie* case of obviousness and, in fact, the Examiner has asserted that Templin teaches away from collectively moving nodes in one or more of the leaf blocks to make the network biconnected, as recited in claim 1, because collectively moving nodes might not minimize node movement.

At paragraph 0039, Templin discloses:

> In one embodiment, the subnet 10 is a mobile "ad hoc" network ("MANET") in that the topology of the subnet 10 and the state of the links (i.e., link state) between the nodes 18 in the subnet 10 can change frequently because several of the nodes 18 are mobile. That is, each mobile node 18 may move from one location to another location within the same subnet 10 or to another subnet 20, dynamically breaking existing links and establishing new links with other nodes 18, 18' as a result. Such movement by one node 18 does not necessarily result in breaking a link, but may diminish the quality of the communications with another node 18 over that link. In this case, a cost of that link has increased. Movement that breaks a link may interrupt any on-going communications with other nodes 18 in the subnet 10 or in the foreign subnet 20, or with servers (e.g., server 40) connected to the Internet 30. In another embodiment, the position of every node 18 in the subnet 10 is fixed (i.e., a static network configuration in which no link state changes occur due to node mobility). As the principles of the invention apply to both static and dynamic network configurations, a reference to the subnet 10 contemplates both types of network environments.

In this section, Templin discloses that movement of a node may diminish the quality of communications over a link or break a link that interrupts on-going communication with other nodes. Nowhere in this section, or elsewhere, does Templin disclose or suggest collectively moving nodes, let alone collectively moving nodes in one or more of the leaf blocks to make the network biconnected, as recited in claim 1.

The Examiner appears to also allege that Li et al. discloses collectively moving nodes and cited sections 1, 5, and 5.1 of Li et al. for support (final Office Action, pg. 10). Applicants submit that the disclosure of Li et al. provides no support for the Examiner's allegation.

As noted above, in section 1, Li et al. discloses an algorithm for computing a trajectory for sending a message from host A to host B by recruiting intermediate hosts to help. This section of Li et al. discloses computing a trajectory for sending a message, not collectively moving nodes in one or more of the leaf blocks to make the network biconnected, as recited in claim 1.

In section 5, Li et al. discloses a method in which mobile hosts inform other hosts of their current position. Nowhere in this section, or elsewhere, does Li et al. disclose or suggest collectively moving nodes in one or more of the leaf blocks to make the network biconnected, as recited in claim 1. In fact, Li et al. is not concerned with whether a network is biconnected. Instead, Li et al. is directed to algorithms for keeping a network connected where the network includes mobile hosts (section 1).

In section 5.1, Li et al. discloses a situation where two hosts want to communicate with each other and these hosts keep track of the other hosts' location. Nowhere in this section, or elsewhere, does Li et al. disclose or suggest collectively moving nodes, let alone collectively moving nodes in one or more of the leaf blocks to make the network biconnected, as recited in claim 1. In fact, Li et

al. is not concerned with whether a network is biconnected. Instead, Li et al. is directed to algorithms for keeping a network connected where the network includes mobile hosts (section 1).

In response to similar arguments made in a previous response, the Examiner alleges that "[b]y continuing to utilize the blocks of nodes formed by Garg, and by moving nodes but seeking to maintain their neighbors, taught by Li, and where Templin further teaches that breaking/changing node relationships increases link costs and interrupts transmissions, collective block movements are taught" (final Office Action, pg. 9). Regardless of the validity of the Examiner's statement, claim 1 recites collectively moving nodes in one or more of the leaf blocks to make the network biconnected, not "collective block movements," as alleged by the Examiner.

Furthermore, Applicants object to the Examiner's piecemeal examination of the above feature of claim 1. That is, instead of addressing the feature of collectively moving nodes in one or more of the leaf blocks to make the network biconnected, the Examiner breaks the feature down into illogical parts by pointing to unrelated sections of three different references for allegedly disclosing different parts of the feature. Such attempts at reconstructing Applicants' claims are clearly impermissible.

For at least these reasons, Applicants submit that claim 1 is patentable over Garg et al., Li et al., and Templin, whether taken alone or in any reasonable combination. Claims 2-7, and 9-18 depend from claim 1 and are, therefore, patentable over Garg et al., Li et al., and Templin for at least the reasons given with regard to claim 1.

Independent claim 19 recites features similar to, yet possibly different in scope from, features recited in claim 1. Claim 19 is, therefore, patentable over Garg et al., Li et al., and

Templin, whether taken alone or in any reasonable combination, for at least reasons similar to reasons given with regard to claim 1.

Independent claim 21 is directed to at least one node in a network that includes a plurality of nodes. The at least one node comprises a network device that is capable of moving within the network; and a movement controller configured to generate a current view of the network, form blocks from groups of one or more of the nodes in the network based on the current view of the network, and identify one or more of the blocks, as one or more identified blocks, to move to make the network biconnected.

Garg et al., Li et al., and Templin, whether taken alone or in any reasonable combination, do not disclose or suggest the combination of features recited in claim 21. For example, Garg et al., Li et al., and Templin do not disclose or suggest a movement controller, within at least one node of a plurality of nodes in a network, that is configured to identify one or more blocks, as one or more identified blocks, to move to make a network biconnected.

The Examiner alleged that this feature is disclosed by Garg et al. at sections 3.1, 4.1, and 4.4, Li et al. at sections 1 and 5, and Templin at paragraph 0039 (final Office Action, pp. 6 and 15). Applicants submit that the disclosures of Garg et al., Li et al., and Templin do not support the Examiner's allegation.

In section 3.1, Garg et al. discloses an algorithm that picks a set of edges that form a 2-vertex connected spanning subgraph and partitions the vertices into blocks that are used to modify the set of edges. Nowhere in this section, or elsewhere, does Garg et al. disclose or suggest a movement controller, within at least one node of a plurality of nodes in a network, that is configured

to identify one or more blocks, as one or more identified blocks, to move to make a network biconnected, as recited in claim 21.

In section 4.1, Garg et al. discloses performing a tree carving of a graph by partitioning the vertex set into subsets. Nowhere in this section, or elsewhere, does Garg et al. disclose or suggest a movement controller, within at least one node of a plurality of nodes in a network, that is configured to identify one or more blocks, as one or more identified blocks, to move to make a network biconnected, as recited in claim 21.

In section 4.4, Garg et al. discloses an algorithm that finds all 2-vertex connected components in a graph, creates a depth first search (DFS) tree in which all of the edges are included in the subgraph, and partitions the vertex set into blocks. Nowhere in this section, or elsewhere, does Garg et al. disclose or suggest a movement controller, within at least one node of a plurality of nodes in a network, that is configured to identify one or more blocks, as one or more identified blocks, to move to make a network biconnected, as recited in claim 21.

If the Examiner persists with this rejection, Applicants again request that the Examiner explain how the above-identified sections of Garg et al. can be reasonably interpreted as disclosing a movement controller, within at least one node of a plurality of nodes in a network, that is configured to identify one or more blocks, as one or more identified blocks, to move to make a network biconnected, as recited in claim 21.

In section 1, Li et al. discloses an algorithm for computing a trajectory for sending a message from host A to host B by recruiting intermediate hosts to help. Nowhere in this section, or elsewhere, does Li et al. disclose or suggest a movement controller, within at least one node of a plurality of nodes in a network, that is configured to identify one or more blocks, as one or more

identified blocks, to move to make a network biconnected, as recited in claim 21. In fact, Li et al. is not concerned with whether a network is biconnected. Instead, Li et al. is directed to algorithms for keeping a network connected where the network includes mobile hosts (section 1).

In section 5, Li et al. discloses a method in which mobile hosts inform other hosts of their current position. Nowhere in this section, or elsewhere, does Li et al. disclose or suggest a movement controller, within at least one node of a plurality of nodes in a network, that is configured to identify one or more blocks, as one or more identified blocks, to move to make a network biconnected, as recited in claim 21. In fact, Li et al. is not concerned with whether a network is biconnected. Instead, Li et al. is directed to algorithms for keeping a network connected where the network includes mobile hosts (section 1).

If the Examiner persists with this rejection, Applicants again request that the Examiner explain how the above-identified sections of Li et al. can be reasonably interpreted as disclosing a movement controller, within at least one node of a plurality of nodes in a network, that is configured to identify one or more blocks, as one or more identified blocks, to move to make a network biconnected, as recited in claim 21.

In paragraph 0039, Templin discloses that movement of a node may diminish the quality of communications over a link or break a link and interrupt on-going communication with other nodes. Nowhere in this section, or elsewhere, does Templin disclose or suggest a movement controller, within at least one node of a plurality of nodes in a network, that is configured to identify one or more blocks, as one or more identified blocks, to move to make a network biconnected, as recited in claim 21. In fact, Templin appears to teach away from a movement controller, within at least one

node of a plurality of nodes in a network, that is configured to identify one or more blocks, as one or more identified blocks, to move to make a network biconnected.

On pages 5-6 of the final Office Action, the Examiner argues that the combination of Garg et al., Li et al., and Templin discloses the above feature of claim 21. Applicants strenuously object to the Examiner's piecemeal examination. It is wholly unreasonable for the Examiner to dissect a claim feature into a few words at a time and cite to unrelated sections of different references for allegedly disclosing these words. Thus, the Examiner's rejection is improper.

For at least these reasons, Applicants submit that claim 21 is patentable over Garg et al., Li et al., and Templin, whether taken alone or in any reasonable combination. Claims 22-28 and 30-37 depend from claim 21 and are, therefore, patentable over Garg et al., Li et al., and Templin for at least the reasons given with regard to claim 21.

Claims 40-42 depend from claim 39. Without acquiescing in the Examiner's rejection of claims 40-42, Applicants submit that the disclosure of Templin does not remedy the deficiencies in the disclosures of Garg et al. and Li et al. set forth above with respect to claim 39. Therefore, claims 40-42 are patentable over Garg et al., Li et al., and Templin for at least the reasons given with regard to claim 39.

REJECTION UNDER 35 U.S.C. § 103 BASED ON GARG ET AL., LI ET AL., TEMPLIN, AND JENNINGS ET AL.

Claims 8 and 29 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Garg et al., Li et al., and Templin in view of Jennings et al. Applicants traverse the rejection.

Claim 8 depends from claim 1, and claim 29 depends from claim 21. Without acquiescing in the Examiner's rejection with regard to claims 8 and 29, Applicants submit that the disclosure of

Jennings et al. does not cure the deficiencies in the disclosures of Garg et al., Li et al., and Templin identified above with regard to claims 1 and 21, respectively. Therefore, claims 8 and 29 are patentable over Garg et al., Li et al., Templin, and Jennings et al., whether taken alone or in any reasonable combination, for at least the reasons given with regard to claims 1 and 21, respectively.

Accordingly, Applicants request the reconsideration and withdrawal of the rejection of claims 8 and 29 under 35 U.S.C. § 103 based on Garg et al., Li et al., Templin, and Jennings et al.

REJECTION UNDER 35 U.S.C. § 103 BASED ON GARG ET AL., LI ET AL., TEMPLIN, AND LIAO ET AL.

Claim 20 stands rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Garg et al., Li et al., and Templin in view of Laio et al. Applicants traverse the rejection.

Claim 20 depends from claim 19. Without acquiescing in the Examiner's rejection with regard to claim 20, Applicants submit that the disclosure of Laio et al. does not cure the deficiencies in the disclosures of Garg et al., Li et al., and Templin identified above with regard to claim 19. Therefore, claim 20 is patentable over Garg et al., Li et al., Templin, and Liao et al., whether taken alone or in any reasonable combination, for at least the reasons given with regard to claim 19.

REJECTION UNDER 35 U.S.C. § 103 BASED ON GARG ET AL., LI ET AL., LIAO ET AL., AND GIBSON ET AL.

Claims 43, 44, 46, and 47 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Garg et al. and Li et al. in view of Liao et al. and Gibson et al. Applicants traverse the rejection.

Claims 43 and 44 depend from claim 39. Without acquiescing in the Examiner's rejection of claims 43 and 44, Applicants submit that the disclosures of Liao et al. and Gibson et al. do not cure the deficiencies in the disclosures of Garg et al. and Li et al. identified above with regard to claim

39. Therefore, claims 43 and 44 are patentable over Garg et al., Li et al., Liao et al., and Gibson et al., whether taken alone or in any reasonable combination, for at least the reasons given with regard to claim 39.

Further, Applicants submit that the Examiner's rejection of claims 43 and 44 lacks merit. For example, claim 43 recites determining a geographic center of the non-biconnected network, and determining weighted distances for moving the one or more nodes toward the geographic center. The Examiner admitted that Garg et al. and Li et al. do not disclose the features recited in claim 43 (final Office Action, pg. 23). The Examiner alleged that Liao et al. discloses determining a geographic center of a network and cited sections 3.1 and 3.3 and pages 6, 8, and 15 of Liao et al. for support (final Office Action, pg. 23). Applicants have carefully reviewed each of these sections/pages identified by the Examiner and find absolutely no disclosure similar to determining a geographic center of a network as a direction to move one or more nodes, as recited in claim 43. Instead, Liao et al. simply discloses selecting a gateway host of a grid as the one nearest to the physical center of the grid (sections 3.1 and 3.3).

The Examiner also admitted that Garg et al., Li et al., and Liao et al. do not disclose determining weighted distances for moving the one or more nodes toward the geographic center, as recited in claim 43 (final Office Action, pg. 23). The Examiner alleged that Gibson et al. discloses this feature and cited section 5, lines 1-7, of Gibson et al. for support (final Office Action, pg. 24). Applicants submit that the disclosure of Gibson et al. does not support the Examiner's allegation.

At column 5, lines 1-7, Gibson et al. discloses:

> As shown in FIG. 3, a first relaxation step 310 moves each node n[i] a distance determined by taking an average (weighted by distance) of the corresponding node q[i] in the other net. Updating the node could violate its constraint by lying outside its cell c[i]. If the new

> position of the node is outside the cell, then the node is moved to a closest point on the cell boundary.

In this section, Gibson et al. discloses moving nodes that represent objects on a three-dimensional surface (col. 3, lines 22-26). Contrary to the Examiner's assertion, just because this section of Gibson et al. uses the words "node," "weighted," and "distance" does not mean that this section of Gibson et al. discloses determining weighted distances for moving one or more nodes toward a geographic center, as recited in claim 43. In fact, Gibson et al. is related to generating a surface model for a three-dimensional object (col. 2, lines 20-21). The disclosure of Gibson et al. has absolutely nothing to do with communication networks. Due to the divergent subject matter of the Gibson et al. disclosure, there could be no reasonable explanation as to why one of ordinary skill in the art at the time of Applicants' invention would have sought to incorporate any feature of Gibson et al. into the combined system of Garg et al., Li et al., and Liao et al.

In response to similar arguments made in a previous response, the Examiner alleges that "Gibson is relied upon to find the weighted distance a node would have to move" (final Office Action, pg. 7). However, as noted above, Gibson et al. has nothing to do with determining weighted distances for moving one or more nodes toward a geographic center, as recited in claim 43, and, in fact, has nothing to do with communication networks. Since the disclosure of Gibson et al. has absolutely nothing to do with communication networks, the Examiner has not established a *prima facie* case of obviousness with respect to claim 43.

For at least these reasons, Applicants submit that claim 43 is patentable over Garg et al., Li et al., Liao et al., and Gibson et al., whether taken alone or in any reasonable combination. Claim 44 depends from claim 43 and is, therefore, also patentable over Garg et al., Li et al., Liao et al., and Gibson et al. for at least the reasons given with regard to claim 43.

Independent claim 46 is directed to a method for achieving biconnectivity in a non-biconnected network that includes a plurality of nodes. The method comprises determining a geographic center of the non-biconnected network; and moving each of one or more of the nodes a weighted distance towards the geographic center to transform the non-biconnected network to a biconnected network.

Garg et al., Li et al., Liao et al., and Gibson et al., whether taken alone or in any reasonable combination, do not disclose or suggest the combination of features recited in claim 46 for at least reasons similar to reasons given with regard to claim 43.

Independent claim 47 is directed to at least one node in a network that includes a plurality of nodes. The at least one of the node comprises a network device that is capable of moving within the network; and a movement controller configured to determine locations of the nodes, identify a geographic center of the network based on the locations of the nodes, and determine a weighted distance that each of the nodes should move toward the geographic center to achieve biconnectivity in the network.

Garg et al., Li et al., Liao et al., and Gibson et al., whether taken alone or in any reasonable combination, do not disclose or suggest the combination of features recited in claim 47 for at least reasons similar to reasons given with regard to claim 43.

Accordingly, Applicants request the reconsideration and withdrawal of the rejection of claims 43, 44, 46, and 47 under 35 U.S.C. § 103 based on Garg et al., Li et al., Liao et al., and Gibson et al.

REJECTION UNDER 35 U.S.C. § 103 BASED ON GARG ET AL., LI ET AL., AND LIAO ET AL.

Claim 48 stands rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Garg et al. and Li et al. in view of Liao et al. Applicants respectfully traverse this rejection.

Independent claim 48 is directed to a system for achieving biconnectivity in a non-biconnected network that includes a plurality of nodes. The system comprises means for identifying a geographic center of the non-biconnected network based on current locations of the nodes; and means for causing each of one or more of the nodes to move towards the geographic center to transform the non-biconnected network to a biconnected network.

Garg et al., Li et al., and Liao et al., whether taken alone or in any reasonable combination, do not disclose or suggest the combination of features recited in claim 48. For example, Garg et al., Li et al., and Liao et al., do not disclose or suggest means for causing each of one or more of the nodes to move towards the geographic center to transform a non-biconnected network to a biconnected network. The Examiner appears to rely on sections 3.1, 3.2, and 4.4 of Garg et al., section 1 of Li et al., and sections 3.1 and 3.3 and pages 6, 8, and 15 of Liao et al. as allegedly disclosing this feature of claim 48 (final Office Action, pp. 28-29).

In section 3.1, Garg et al. discloses an algorithm that picks a set of edges that form a 2-vertex connected spanning subgraph and partitions the vertices into blocks that are used to modify the set of edges. Nowhere in this section, or elsewhere, does Garg et al. disclose or suggest means for causing each of one or more of the nodes to move towards the geographic center to transform a non-biconnected network to a biconnected network, as recited in claim 48.

In section 3.2, Garg et al. discloses that the total number of edges picked is at most (3/2)OPT. Nowhere in this section, or elsewhere, does Garg et al. disclose or suggest means for

causing each of one or more of the nodes to move towards the geographic center to transform a non-biconnected network to a biconnected network, as recited in claim 48.

In section 4.4, Garg et al. discloses an algorithm that finds all 2-vertex connected components in a graph, creates a depth first search (DFS) tree in which all of the edges are included in the subgraph, and partitions the vertex set into blocks. Nowhere in this section, or elsewhere, does Garg et al. disclose or suggest means for causing each of one or more of the nodes to move towards the geographic center to transform a non-biconnected network to a biconnected network, as recited in claim 48.

As noted above, in section 1, Li et al. discloses an algorithm for computing a trajectory for sending a message from host A to host B by recruiting intermediate hosts to help. This section of Li et al. discloses computing a trajectory for sending a message, means for causing each of one or more of the nodes to move towards the geographic center to transform a non-biconnected network to a biconnected network, as recited in claim 48.

As noted above, Applicants have carefully reviewed sections 3.1 and 3.3 and pages 6, 8, and 15 of Liao et al. and find absolutely no disclosure similar to means for causing each of one or more of the nodes to move towards the geographic center to transform a non-biconnected network to a biconnected network, as recited in claim 48. Instead, Liao et al. simply discloses selecting a gateway host of a grid as the one nearest to the physical center of the grid (sections 3.1 and 3.3).

The Examiner has not explained how the above sections of Garg et al., Li et al., or Liao et al. can reasonably be construed as disclosing means for causing each of one or more of the nodes to move towards the geographic center to transform a non-biconnected network to a biconnected

network, as recited in claim 48. As such, a *prima facie* case of obviousness has not been established with regard to claim 48.

For at least the foregoing reasons, Applicants submit that claim 48 is patentable over Garg et al., Li et al., and Liao et al., whether taken alone or in any reasonable combination.

Accordingly, Applicants request the reconsideration and withdrawal of the rejection of claim 48 under 35 U.S.C. § 103 based on Garg et al., Li et al., and Liao et al.

REJECTION UNDER 35 U.S.C. § 103 BASED ON GARG ET AL., LI ET AL., LIAO ET AL., GIBSON ET AL., AND PROCTOR, JR. ET AL.

Claim 45 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Garg et al., Li et al., Liao et al., and Gibson et al. in view of Proctor, Jr. et al. Applicants traverse the rejection.

Claim 45 depends from claim 43. Without acquiescing in the Examiner's rejection of claim 45, Applicants submit that the disclosure of Proctor, Jr. et al. does not cure the deficiencies in the disclosures of Garg et al., Li et al., Liao et al., and Gibson et al. identified above with regard to claim 43. Therefore, claim 45 is patentable over Garg et al., Li et al., Liao et al., Gibson et al., and Proctor, Jr. et al., whether taken alone or in any reasonable combination, for at least the reasons given with regard to claim 43.

Accordingly, Applicants request the reconsideration and withdrawal of the rejection of claim 45 under 35 U.S.C. § 103 based on Garg et al., Li et al., Liao et al., Gibson et al., and Proctor, Jr. et al.

REJECTION UNDER 35 U.S.C. § 103 BASED ON HSU AND LI ET AL.

Claims 50-52 and 54 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Hsu in view of Li et al. Applicants traverse the rejection.

Independent claim 50 is directed to a method for achieving biconnectivity in a one-dimensional non-biconnected network that includes a plurality of nodes. The method comprises determining initial positions of the nodes in the one-dimensional non-biconnected network; determining a movement schedule for the nodes using one or more linear programming techniques; and causing one or more of the nodes to move based on the determined movement schedule to form a biconnected network from the one-dimensional non-biconnected network.

Hsu and Li et al., whether taken alone or in any reasonable combination, do not disclose or suggest the combination of features recited in claim 50. For example, Hsu and Li et al. do not disclose or suggest determining a movement schedule for the nodes using one or more linear programming techniques.

The Examiner alleged that Li et al. discloses determining a movement schedule and Hsu discloses using linear programming (final Office Action, pp. 30-31). Applicants strenuously object to the Examiner's piecemeal examination. It is wholly unreasonable for the Examiner to dissect a claim feature into a few words at a time and cite to unrelated sections of different references for allegedly disclosing these words. Thus, the Examiner's rejection is improper.

Because neither Hsu or Li et al. discloses the feature of determining a movement schedule for the nodes using one or more linear programming techniques, the combination of Hsu and Li et al. cannot disclose or suggest this feature. Thus, the Examiner has not established a prima facie case of obviousness with regard to claim 50.

For at least these reasons, Applicants submit that claim 50 is patentable over Hsu and Li et al., whether taken alone or in any reasonable combination. Claims 51 and 52 depend from claim 50

and are, therefore, patentable over Hsu and Li et al. for at least the reasons given with regard to claim 50.

Independent claim 54 is directed to a system for achieving biconnectivity in a one-dimensional non-biconnected network that includes a plurality of nodes. The system comprises means for determining initial positions of the nodes in the one-dimensional non-biconnected network; means for determining a movement schedule optimally in polynomial time based at least in part on the initial positions of the nodes and a number of the nodes in the one-dimensional non-biconnected network; and means for causing one or more of the nodes to move based on the determined movement schedule to achieve biconnectivity in the one-dimensional non-biconnected network.

Hsu and Li et al., whether taken alone or in any reasonable combination, do not disclose or suggest the combination of features recited in claim 54. For example, Hsu and Li et al. do not disclose or suggest means for determining a movement schedule optimally in polynomial time based at least in part on the initial positions of the nodes and a number of the nodes in the one-dimensional non-biconnected network.

The Examiner alleged that Hsu, at the abstract and sections 1 and 3, and Li et al., at section 1, disclose the above-identified feature of claim 54 (final Office Action, pp. 31-32). Applicants submit that the disclosures of Hsu and Li et al. do not support the Examiner's allegation.

In the abstract, Hsu discloses a technique for adding a minimum number of edges to an undirected graph in order to obtain a biconnected graph. Nowhere in this section, or elsewhere, does Hsu disclose or suggest determining a movement schedule (as admitted by the Examiner at pg. 31 of the final Office Action), let alone means for determining a movement schedule optimally in

polynomial time based at least in part on the initial positions of the nodes and a number of the nodes in the one-dimensional non-biconnected network, as recited in claim 54.

In section 1, Hsu discloses a linear-time sequential algorithm for identifying a set of edges to add to an undirected graph in a single execution. Nowhere in this section, or elsewhere, does Hsu disclose or suggest determining a movement schedule (as admitted by the Examiner at pg. 31 of the final Office Action), let alone means for determining a movement schedule optimally in polynomial time based at least in part on the initial positions of the nodes and a number of the nodes in the one-dimensional non-biconnected network, as recited in claim 54.

In section 3, Hsu discloses an algorithm for adding a set of edges to a graph. Nowhere in this section, or elsewhere, does Hsu disclose or suggest determining a movement schedule (as admitted by the Examiner at pg. 31 of the final Office Action), let alone means for determining a movement schedule optimally in polynomial time based at least in part on the initial positions of the nodes and a number of the nodes in the one-dimensional non-biconnected network, as recited in claim 54.

In section 1, Li et al. discloses an algorithm for computing a trajectory for sending a message from host A to host B by recruiting intermediate hosts to help. Nowhere in this section, or elsewhere, does Li et al. disclose or suggest means for determining a movement schedule optimally in polynomial time based at least in part on the initial positions of the nodes and a number of the nodes in the one-dimensional non-biconnected network, as recited in claim 54.

Because neither Hsu or Li et al. discloses the feature of means for determining a movement schedule optimally in polynomial time based at least in part on the initial positions of the nodes and a number of the nodes in the one-dimensional non-biconnected network, the combination of Hsu

and Li et al. cannot disclose or suggest this feature. Thus, the Examiner has not established a prima facie case of obviousness with regard to claim 54.

On page 9 of the final Office Action, the Examiner alleges that "it would have been obvious…to utilize the linear programming techniques of Hsu with that of Li in order to utilize an efficient solution to determining biconnectivity." Applicants respectfully submit that the Examiner's motivation statement lacks merit.

Hsu discloses a technique to solve the problem of adding a minimum number of edges to an undirected graph in order to obtain a biconnected resulting graph (abstract). Li et al. discloses an algorithm for computing a trajectory for sending a message from host A to host B by recruiting intermediate hosts to help (section 1). Combining the disclosures of Li et al. and Hsu would not produce an "efficient solution to determining biconnectivity," as alleged by the Examiner. In fact, one of ordinary skill in the art would not have been motivated to combine the disclosures of Li et al. and Hsu absent impermissible hindsight gleaned solely from Applicants' specification.

Because the Examiner has not provided a valid motivation for combining an alleged feature of Li et al. with the disclosure of Hsu., the Examiner has not established a *prima facie* case of obviousness with regard to claim 54.

For at least these reasons, Applicants submit that claim 54 is patentable over Hsu and Li et al., whether taken alone or in any reasonable combination.

Accordingly, Applicants request the reconsideration and withdrawal of the rejection of claims 50-52 and 54 under 35 U.S.C. § 103 based on Hsu and Li et al.

REJECTION UNDER 35 U.S.C. § 103 BASED ON HSU, LI ET AL., AND LIN ET AL.

Claims 53 and 55 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Hsu and Li et al. in view of Lin et al. Applicants traverse the rejection.

Claim 53 depends from claim 50, and claim 55 depends from claim 54. Without acquiescing in the Examiner's rejection of claims 53 and 55, Applicants submit that the disclosure of Lin et al. does not cure the deficiencies in the disclosures of Hsu and Li et al. identified above with regard to claims 50 and 54, respectively. Therefore, claims 53 and 55 are patentable over Hsu, Li et al., and Lin et al., whether taken alone or in any reasonable combination, for at least the reasons given with regard to claims 50 and 54, respectively.

Accordingly, Applicants request the reconsideration and withdrawal of the rejection of claims 53 and 55 under 35 U.S.C. § 103 based on Hsu, Li et al., and Lin et al.

CONCLUSION

In view of the foregoing remarks, Applicants respectfully request the Examiner's reconsideration of the application and the timely allowance of the pending claims.

If the Examiner believes that the application is not now in condition for allowance, Applicants respectfully request that the Examiner contact the undersigned to discuss any outstanding issues.

Applicants believe no fee is due with this response other than as reflected on the attached Petition for Extension of Time. However, if a fee is due, please charge our Deposit Account No. 18-1945, under Order No. BBNT-P01-253 from which the undersigned is authorized to draw.

Dated: August 11, 2008

Respectfully submitted,

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